# Visualizing the Math Department

The Planning Committee

December 2020

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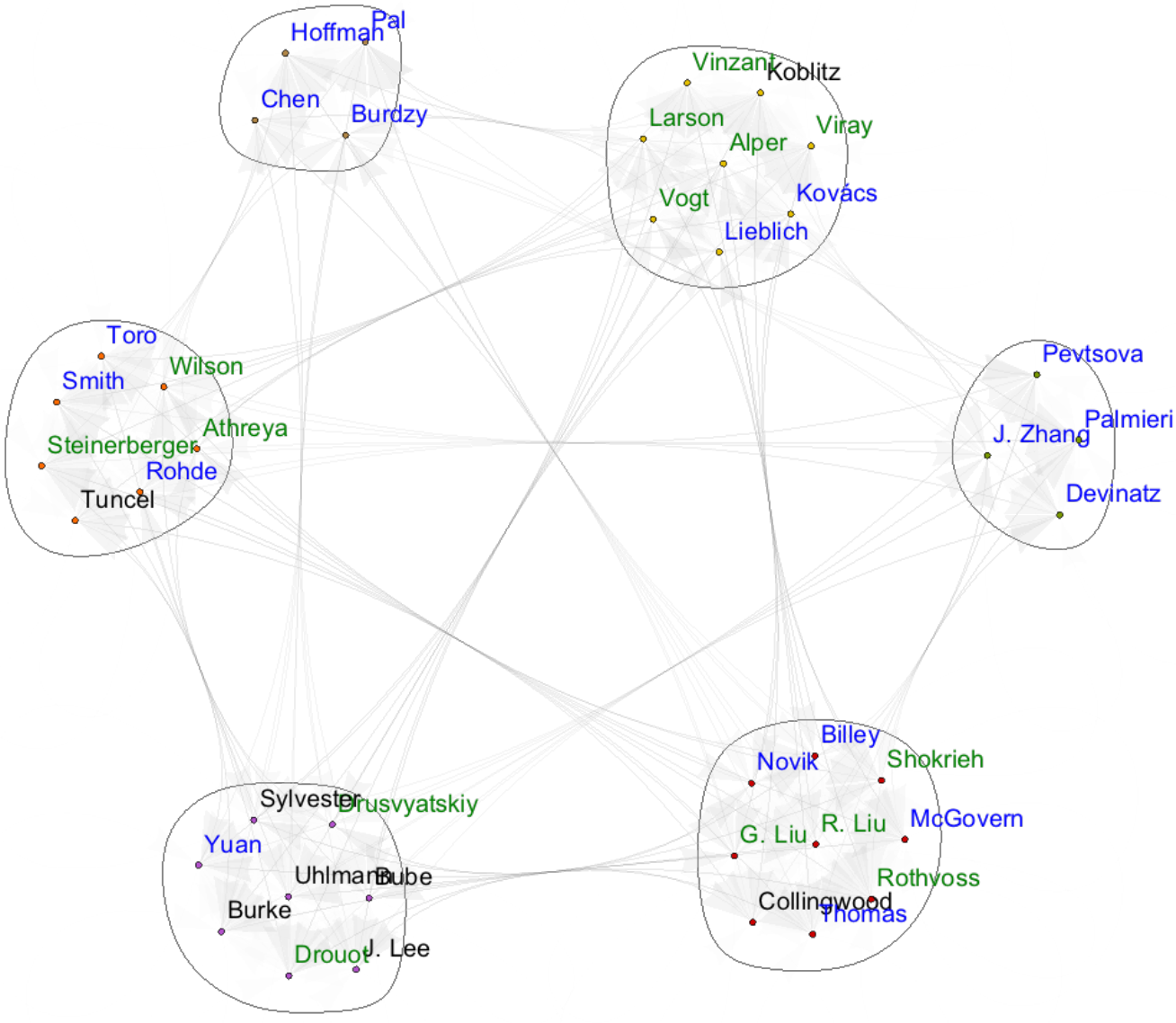
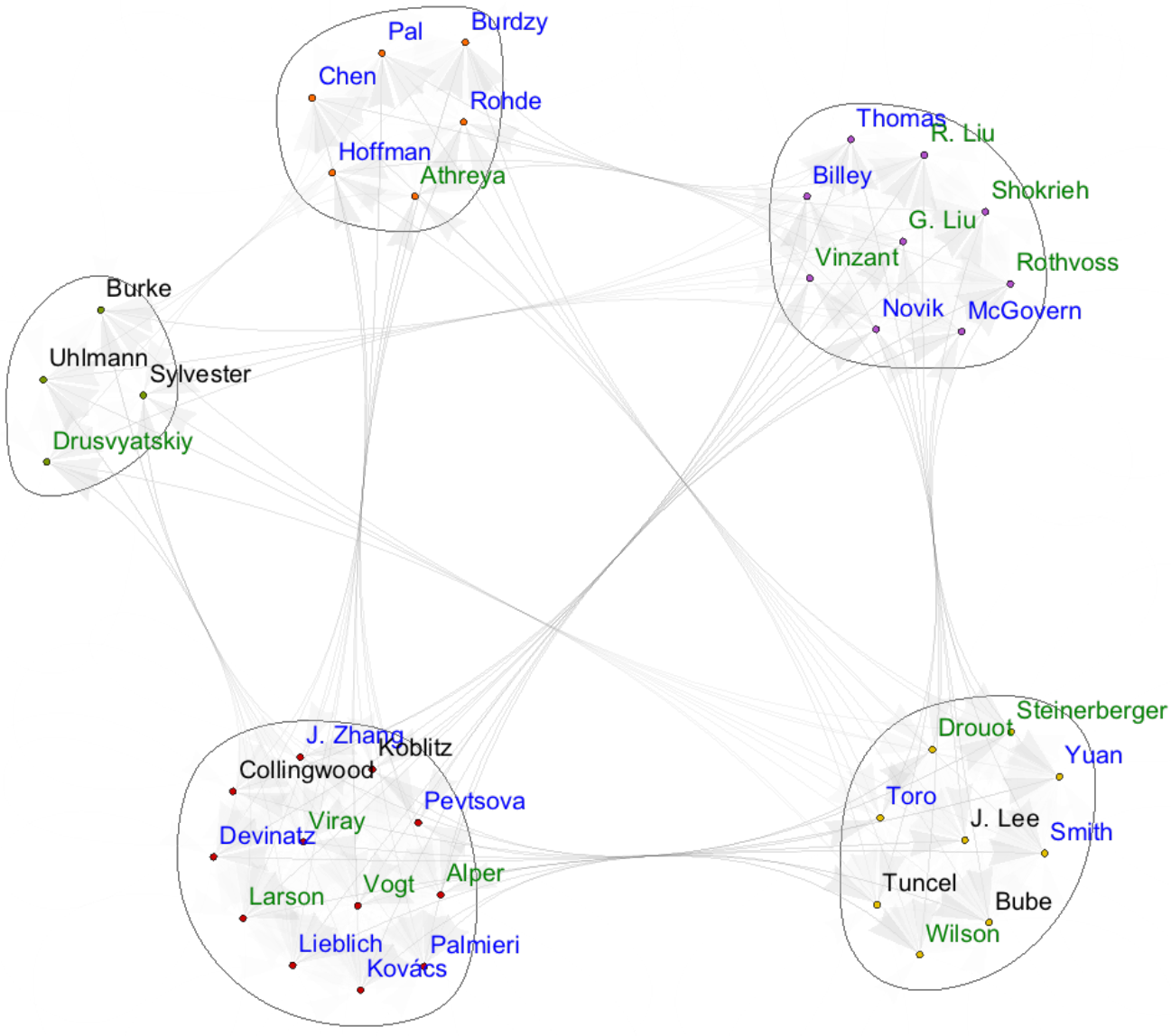
4. The pictures are imperfect snapshots from a certain angle rather than absolute truth.

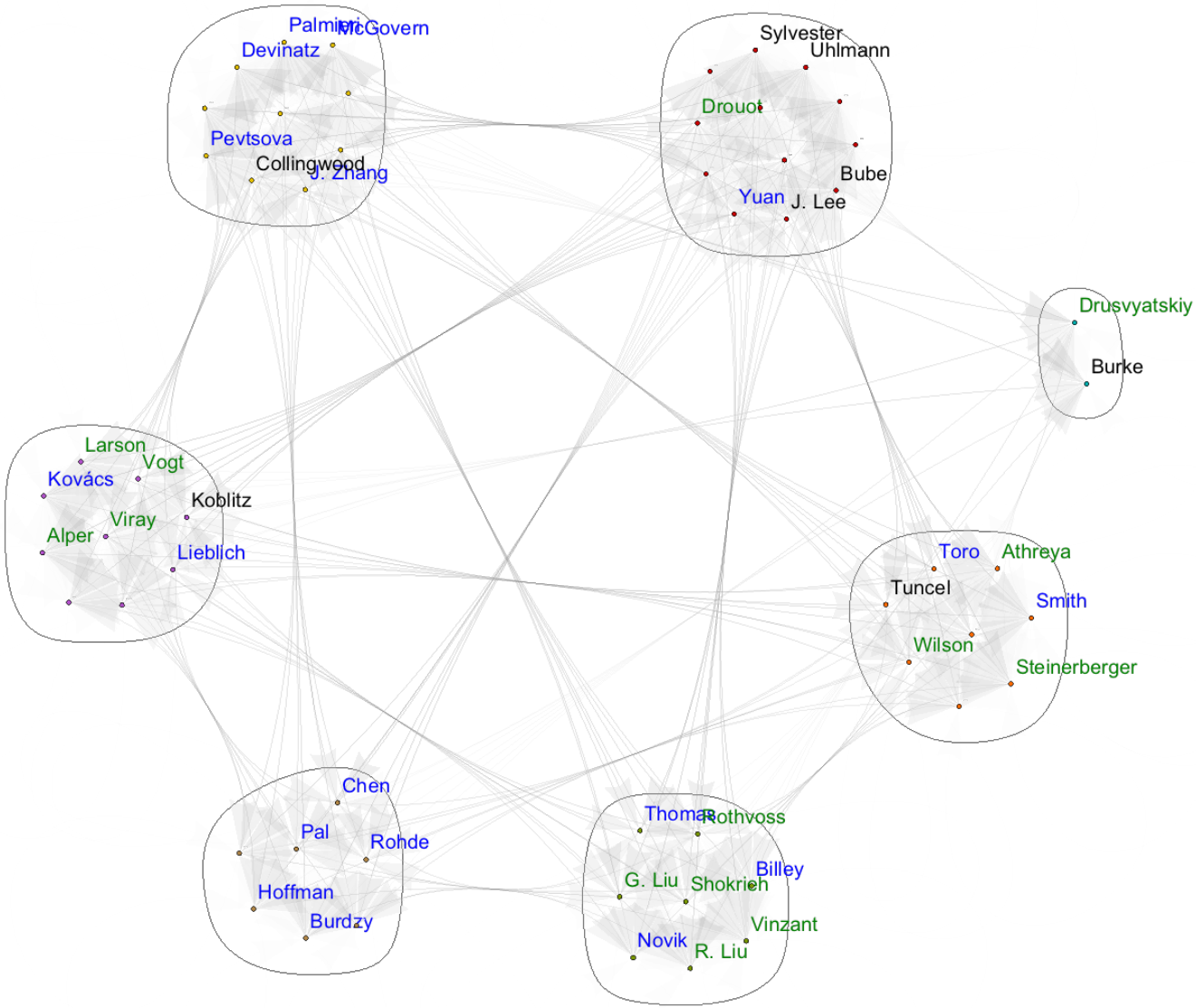
# Current Faculty Composition (2020)



# Another Perspective (2020)



# Current Faculty (2020) + Recent Departures (until 2014)



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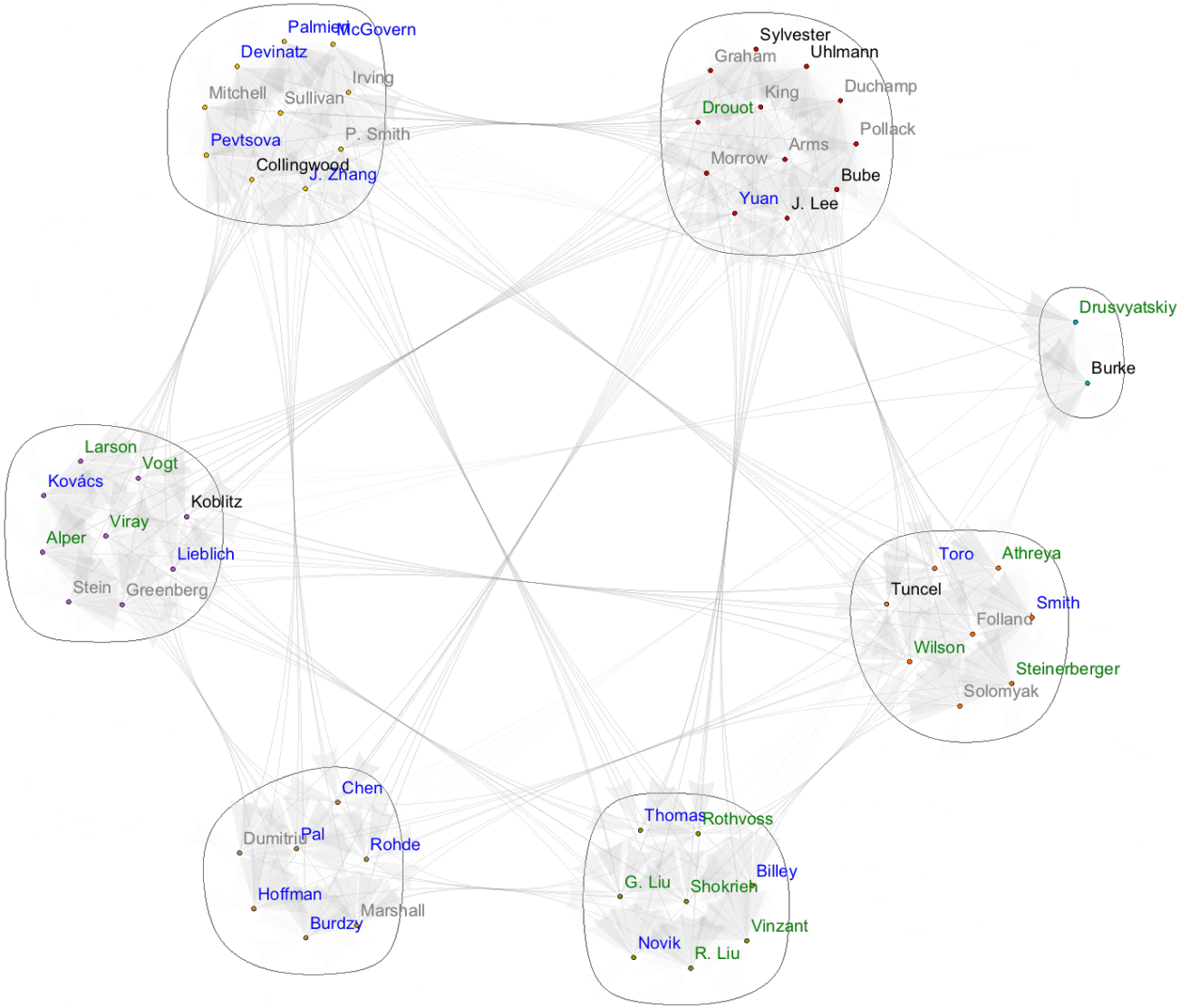
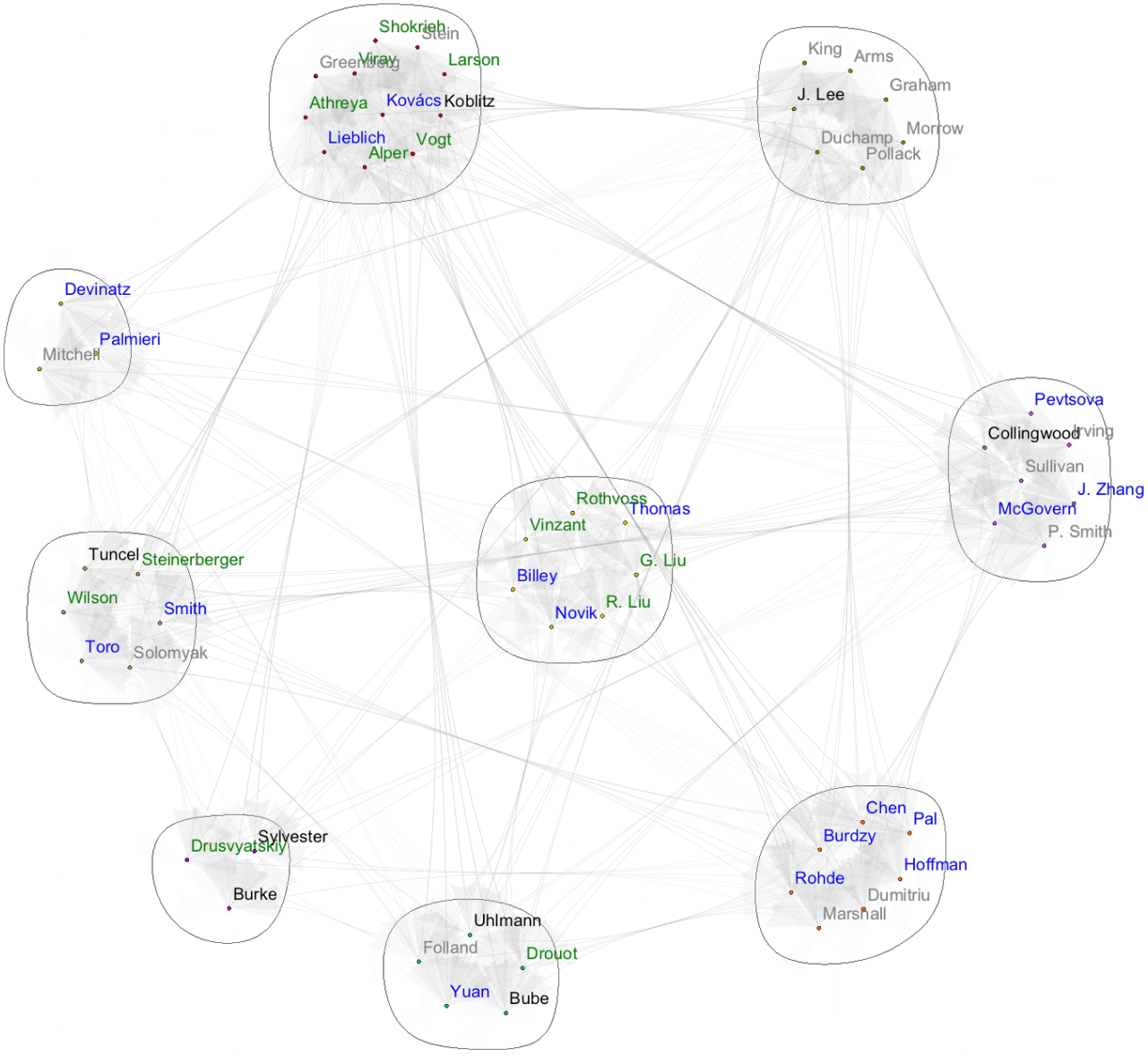


# Current Faculty + Recent Departures: another view



# Technical Notes

- We create a graph $G = (V, E)$, where $V$ are faculty members and $E$ are (weighted) edges.
- Between any two faculty members we create a *similarity score*

**MSC$_1$**

1. The number of MSC classifications that they have in common.
2. Add an additional point if they have the same primary.

**MSC$_2$**: primary, secondary, tertiary

$$\begin{pmatrix} 4 & 3 & 2 \\ 3 & 2 & 1 \\ 2 & 1 & 1 \end{pmatrix} \quad \text{points}$$

**NSF**

1. Add a point if they apply to the same NSF division.

**Seminar Attendance**: often, regularly, occasionally

$$\begin{pmatrix} 9 & 6 & 3 \\ 6 & 4 & 2 \\ 3 & 2 & 1 \end{pmatrix} \quad \text{points}$$

# Technical Notes

- The formula that we used is
  $\textbf{Similarity}_i = 2\ \textbf{MSC}_i + \textbf{NSF} + 0.1\ \textbf{Seminar}$.
  This seems to lead to somewhat reasonable results, however, other parameter choices are certainly conceivable.
- We then create a Graph by connecting each faculty member to the $k$ faculty members that they have the highest similarity score with. $k$ acts as a parameter introducing scale: large values of $k$ lead to larger clusters, smaller values of $k$ lead to smaller cluster. $(2 \leq k \leq 20)$
- This graph is then partitioned using Mathematica's FindGraphCommunities. The pictures above use the Spectral and the Modularity setting.